Assessment of intra-operative nociception in dogs.

An observational pilot study.

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Objectives

Assessment of nociception under anaesthesia is essential to guide interventional analgesic administration, but guidelines for **when to intervene** are anecdotal. Several studies use a value of 20% above baseline to suggest nociception (Palomba et al 2020, Vettorato et al 2012). This pilot study aimed to demonstrate changes in **basic physiological parameters used to assess nociception** in dogs during anaesthesia and response to interventional analgesia.

Methods

- **35 dogs** undergoing elective surgical (orthopaedic and soft tissue) procedures.
- Baseline **heart rate, respiratory rate & arterial blood pressure** (direct, oscillometric or Doppler) and **end-tidal carbon dioxide** concentration were recorded prior to surgical incision.
- **Anaesthetic depth** was verified as appropriate prior to first incision.
- Following incision **if values exceeded 20% of baseline**, suggesting nociception, further analgesia was provided.
- Analgesic techniques and interventions were at the discretion of the anaesthetist and not dictated by the study.

Locoregional Technique	Number Requiring Rescue Analgesia	Intervention Options
Epidual	9/16	- Fentanyl - Methadone - Ketamine - Dexmedetomidine + Methadone
Nerve block	6/13

Results

- **54% (19/35)** of dogs required analgesic intervention. Of these, 31% (6/19) reacted on more than one occasion.
- **Heart rate increased first in 51% of cases** by a mean of 66% (20-136%).
- **Respiratory rate increased first in 42% of cases** by a mean of 77% (20-190%).
- Where direct blood pressure was measured, this increased concurrently with heart rate.
- **Oscillometric blood pressure was a late indicator of nociception.**
- **Rescue analgesics were deemed effective in 94% of episodes** (33/35), although the primary parameter only returned to within 10% of baseline in 17% (6/35).
- The **most common adverse effect of interventional analgesics** was short-duration apnoea.

Rescue Analgesic	Adverse Reaction	Duration
Fentanyl IV	Apnoea in 6/18 interventions	Average 3m18s (1-6mins). Easily managed with manual IPPV.
Methadone IV	Apnoea in 2/4 interventions	Average 5m0s. Easily managed with manual IPPV.

Impact

- **Heart rate** was the **earliest** indicator of nociception.
- The **greatest change** was seen in **respiratory rate**.
- This study supports using an increase in 20% above baseline as an indicator of nociception.
- Interventional analgesic options should be discussed as part of the anaesthetic plan.

References

Palomba, A., De Gennaro, C., Vettorato, E., & Corletto, F (2020) Preventive analgesic effect of peripheral nerve blocks in dogs undergoing tibial plateau levelling osteotomy. *Veterinary Anaesthesia & Analgesia* 47(1) 119-128 doi.org/10.1016/j.vaa.2019.08.046

Vettorato, E., Bradbrook, C., Gurney, M. et al. (2012) Peripheral nerve blocks of the pelvic limb in dogs: a retrospective clinical study. *Vet Comp Orthop Traumatol*, 25, 314-320

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